

Methodology for Sampling and Calculating Losses of Diethanolamine (DEA)

Objective: The following task is to assess potential on-site reservoirs of DEA and to perform a mass-balance determination of potential quantities released off-site during the Hurricane Isaac flooding.

Overview of Methodology:

1. Potential on-site reservoirs of DEA in on-site environmental media will be sampled. Sampling will be done in a manner to account for potential stratification/separation of the recovered water, and/or spatial variation in soil/sediment contamination. Current potential reservoirs may include the following:
 - Tank B50-13 (Possible Residual Heel still in Tank)
 - Tank B50-14 (Material Removed by Vacuum Truck into Frac Tanks)
 - Tank B80-3 (Material Removed by Vacuum Truck into Frac Tanks)
 - Water from A Tank Farm Containment Area (Removed to Tank A50-7)
 - Water from B Tank Farm Containment Area (Removed to two E12.5 Tanks)
 - Water from D/E Tank Farm Containment Area (Removed to Tank EQ-1)
 - Sediment in B Tank Farm Containment Area (this is a concrete containment area, but may contain flood sediments)
 - Tank E12.5-13 (Holding B Tank Farm Storm Water)
 - Tank E12.5-15 (Holding B Tank Farm Storm Water)
 - Waste Water Equalization Tank EQ-1
 - Recovered on-site soils/sediments (includes soils/sediments previously removed as best management practice to prevent further off-site migration. These materials are currently or will be contained in roll-off boxes)
 - Tank A50-7 (Holding A Tank Farm Storm Water)
2. Liquid samples will be analyzed by a modified USEPA Method 8015, involving direct injection with flame ionization detection (FID) at Test America, Mobile, Alabama.
3. Solid samples will be analyzed using a modification of USEPA Method MS888, which involves HPLC separation with tandem mass spectroscopy. This method is currently under development at Pace Laboratories, St. Rose, Louisiana and at Gulf Coast Analytical Laboratories (GCAL), Baton Rouge, Louisiana.
4. Based on the results of reservoir analysis, together with available information on the quantity (mass/volume) of materials, the quantity of DEA contained in these materials will be estimated. Table 1 below provides a summary of potential on-site reservoirs and the methodology proposed to determine the quantity of DEA contained in each.
5. Residual product, if any, remaining in Tank B50-13 will be determined.
6. The total quantity of DEA contained on site will be determined by adding the quantity of residual material in Tank B50-13 plus the quantity estimated in on-site environmental media.
7. The quantity of DEA released off-site will be determined by subtracting the pre-flood amount in Tank B50-13, minus the amount estimated in on-site environmental media reservoirs.



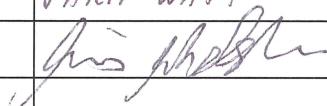
Table 1. Summary of Potential DEA Sources and Volume/Mass Determination

Source	Description	DEA Volume/Mass Determination
Tank B50-13	Potential residual heel in tank	Direct measurement
Tank B50-14	Residual material moved to frac tanks	DEA concentration in frac tank times tank volume
Tank B80-3	Residual material moved to frac tanks	DEA concentration in frac tank times tank volume
Water in A Tank Farm Containment Area	Storm water in containment area transferred to Tank A50-7	See Tank A50-7
Water in B Tank Farm Containment Area	Storm water in containment area transferred to two E12.5 tanks	See two E12.5 tanks
Water in D/E Tank Farm Containment Area	Storm water in containment area transferred to Tank EQ-1	See Tank EQ-1
Tank E12.5-13	Storm water from Tank Farm B containment area	DEA concentration in tank times tank volume
Tank E12.5-15	Storm water from Tank Farm B containment area	DEA concentration in tank times tank volume
Tank EQ-1	Storm water	DEA concentration in tank times tank volume
On-Site Soils/Sediments	Potentially contaminated soils removed and placed in roll-offs	See recovered on-site soils/sediments/debris
Recovered On-Site Soils/Sediments & Debris	Potentially contaminated soils/sediments from tank farm and site	DEA concentration of soils/sediment & debris times weight determined at disposal facility
Tank A50-7	Storm water from Tank Farm A containment area	DEA concentration in tank times tank volume

Stolthaven New Orleans LLC
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Quality Assurance: The goal of the field Quality Assurance (QA) program is to document that samples are collected without introducing a bias (i.e., the effects of accidental cross- or systematic contamination are eliminated) and refers to the sampling and analysis procedures for generating valid and defensible data. To provide QA for the proposed sampling, the following QA will occur:

- Field Duplicate Sample (1 in 10 samples)
- Two field Split Samples provided to Pace and GCAL
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) (1 in 20 samples)
- Laboratory quality control (procedures will be conducted in a manner consistent with relevant State and federal regulatory guidance)

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